



New hard material-reinforced stabilised zirconia ceramic

Publication number: DE19733700

Publication date: 1998-04-16

Inventor: KRELL ANDREAS DR (DE); BLANK PAUL DR (DE)

Applicant: FRAUNHOFER GES FORSCHUNG (DE)

Classification:

- **international:** C04B35/488; F16C33/04; F16C33/30; C04B35/486;
F16C33/04; F16C33/30; (IPC1-7): C04B35/48;
C04B35/488; F16C33/12; F16C33/62

- **european:** C04B35/488; F16C33/04C; F16C33/30

Application number: DE19971033700 19970804

Priority number(s): DE19971033700 19970804; DE19961040923 19961004

[Report a data error here](#)

Abstract of DE19733700

A novel, hard material-reinforced, stabilised ZrO₂ ceramic, with mechanical stability under hydrothermal conditions, has the composition (by vol.) 5-50% hard material component with 0.2-1 μ m grain size, 2-45% Al₂O₃ with 0.1-1 μ m grain size and balance (1-30%) stabilised ZrO₂ phase with a solid solution of 2-3.5 mol% Y₂O₃ and 1-7 mol% CeO₂ (based on the ZrO₂ content in the starting powder composition) and with 0.2-0.7 μ m grain size. Production of the above ceramic involves: (a) providing a ZrO₂ powder which contains Y₂O₃ in solid solution and which is doped with Ce with high spatial distribution homogeneity wrt. the ZrO₂ particles, this homogeneity being fixed for the subsequent process steps without significantly modifying the electrokinetic properties at the ZrO₂ particle surfaces; (b) subjecting this ZrO₂ powder, of less than 0.5 μ m mean particle size, to wet mixing and grinding together with a hard material component of less than 5 μ m mean particle size and Al₂O₃ of less than 0.7 μ m mean particle size, with addition of the requisite organic pressing aid and sintering additive; and (c) moulding and sintering the resulting mixture. Preferably, the hard material component is TiC of any stoichiometry. The stabilised ZrO₂ preferably has a primary particle size of 10-60 nm and the Al₂O₃ preferably contains \leq 2% coarse particles of greater than 2 μ m size. The sintering additive preferably comprises 2-10 wt. % TiH₂.

Data supplied from the esp@cenet database - Worldwide